



管道充水工况下气液两相流瞬态数值模拟研究

Research on Transient Numerical Modeling of Gas-liquid Two-phase Flow i

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英文关键词: [Water-filling pipelines](#) [Gas-liquid two-phase flow](#) [VOF model](#) [Transient numerical moc](#)

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中文摘要

介绍了VOF模型及其控制方程。结合 $k-\epsilon$ 湍流模型,对三维管道充水过程的气液两相流进行了瞬态数值模拟。建立了管道充水过程中的流动特性、能量损耗进行分析。模拟结果表明:充水过程中存在分层、段塞、气团、气泡流;气体在管道中以气团、气泡流型流,两相流能量消耗增大的原因是存在气液相间相互作用以及流体与管壁摩擦系数的增大;倾斜下降管道剖面水平方向轴向流速对称轴向流速峰值,气液交界处轴向流速最低。

英文摘要

This paper presents the volume of fluid (VOF) model and its governing equations. A three-dimensional transient numerically by using $k-\epsilon$ turbulent model. The paper gives a water-filling mathematical model of liquid volume fraction losses in the gas-liquid two-phase flow are also analyzed. The modeling results show that there are four flow regime exist in water-filling pipelines. The gas will move to downstream water networks with flow as plug and bubbly flow p losses of two-phase flow, which are more than single-phase flow, are due to the interaction between the interfaces c friction factor between the fluid and pipe walls. In inclined downward pipes, the axial velocity profiles in horizon centerline the axial velocity profiles of gas and liquid near the top and the bottom of the pipe appear peaks, respe liquid the one appears the slowest.